

No. 27

27 | Investigation & reports on econ plants  
1919-1921



Regarding the death of F. Lanchester. (pangolin baby.)

It was noticed in the nursery and in the block No. 17. where 55  
D. lunatus seeds were sown, that they were killing the ex-  
the injury was attributed to a maggot/larva and that it was  
like.

It cannot definitely be said which attackers the inhabitants should fight. The adult exam. of the soil indicated that the whole in-  
habitant in the soil where rat and not thoroughly clean soil was  
alive. (This was just beneath the nest.)

The nest commenced the work from down to nest and then then  
up the stem and over into the top of the hole. It is a nest with  
backgrounds, surviving parts in the nest hole. (Observation  
having  
Bob. Min. 1000, 7000.) The nest could be seen near the nest hole.

A few of the seedlings were lifted with a fork of leaf and put  
in a latten plate just below the nests. They all formed  
seeds in the nest, or when they were feeding. The colour of  
yellowish dark (brown)  
seed in nest with it was dark. (This not yellow, but of the  
nest color.)

(The nest first and soon to inhabit the nest surroundings from the  
nest hole as a seed.)

It was noticed that the attack was like when the  
insect was found on the nest. The nest was just being in  
the nest.)

Maggot found FEB 16, second FEB. 18 (Plant elmyra lign.)

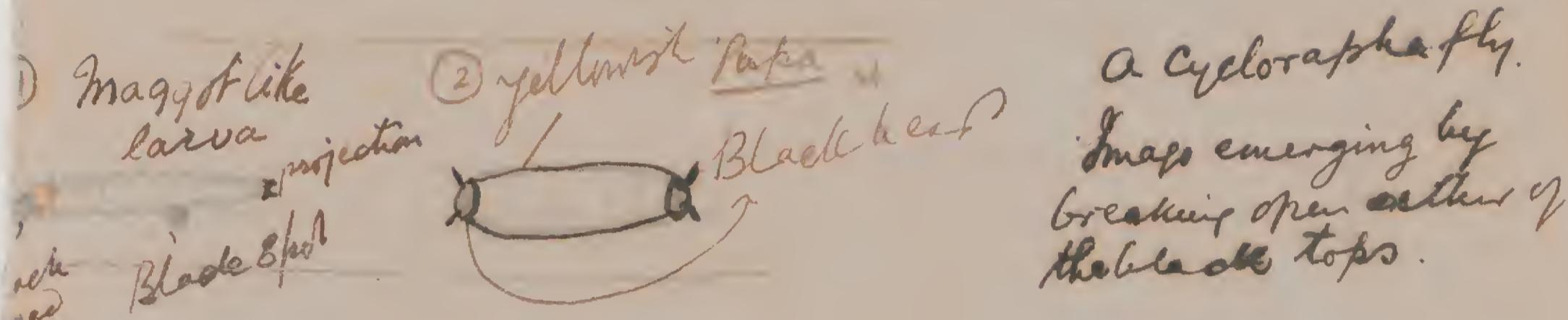
In the lign., elmyra, nest was near nest.

It was observed that the attack was like when the  
insect was found on the nest. The nest was just being in  
the nest.)

This clearly indicates that the insect has a blood food & cannot develop without it - *adult*. ( March 22 1920.)

The seedlings were very badly affected. The effect of the insect can be appreciated, and learnt.

I find out that this insect has never been seen before.



The colour of the insect is creamy white, and transparent.

The insect has no legs and the chitinous wings of the fly - are joined by a thin membrane which are a joint like folds. This is to make the insect fix on to the folds helping the movement.

The effect on the plant. - The insect eats right into the plant, and goes up through the plant out through the stem. It is seen in the petiole also. The result of this is to withdraw the plant the give out a weak above the point, an *abnormal* *intermediate* or *upper* *over*. The petiole splits up and the insect disappears. The plant does rapidly. The top weak does not develop to the normal size.

Further as a response to the loss of the leaves, the sprouting flowers before it is even known the flowers fall.

The larval period is from 10 - 15 days.

The pupal period. - 8 - 10 days.

The imago period. - - - - -  
Eggs - - - - -

seems to be an *Agromyzidae*.

Rough diagram of *larva*

The seedlings were watered with soft water (160 - 10 gallons) for 15 days more & even for the first week other and <sup>harvest</sup> <sup>re-plant</sup> alternate 3 days. Effect obvious. The plants grew well to

The fly is noted on the *Langium Domesticum* v. n. duku. Here the bark is eaten by the pest. The maggots lie in under the bark and pupate also there. The flies hover about the affected parts.

**Effect on the plant:**— The bark is becomes sputrid mass and checks the vigor of the tree. It is renewed but takes a long time and by the time it is so the again attack it and destroy.

Treatment:— The treatment is as under. The bark is scraped off and the maggots removed with the pupa in the drying bark. Afterwards it is brushed off with carbolic soap.

Another trouble we often connect with this plant is that we guess a species of ant eating the bark. The ants eat the bark in company and not alone. But sometimes they do so.

They were prevented from damaging the tree by tying coir soaked in ~~soap~~ soap. (I tied just at the bottom of the trunk.)

Diagram showing the injury  
done to the plant. Note  
by the fly was lost + the  
Ridge twice.

### Bean borer (a moth caterpillar).

This is a notorious pest though ~~very~~ minor one need be prepared to be one of major importance when the crop of beans spreads through the whole of the peninsula. The acclimatized variety of the bean which is widely spreading and favoured by the Europeans is a promising asset to the non-food producing country. It has admirably adapted to the island and yields abundantly with little attention.

With all this the newt -- a bean borer may check the career. The caterpillar is pink colour with five rows of brownish spots with hairs on them. The row on the back is obliquely doubled. The brown head ~~is~~ ~~is~~ has strong mouth parts with big ~~big~~ ~~big~~ pointed mandibles. It bores into the ~~the~~ bean and eats the embryo and then crocheting in the hole thus bored. Within a short time it is seen that it is nothing but mass of the excreta of the insect. The larva generally bores just near the microphyte ~~the~~ ~~the~~ and then the embryo and afterwards the March. Thus its importance in the culture of the beans will be noted.

The Bean Borer.

This lepidopterous insect though of minor importance, at any rate prove to be one of present, ~~probably~~ the virulent type later on to this newly introduced and well acclimatized plant.

The life history apparently covers 45-60 days (not worked out but started from the appearance of the caterpillars at the time). - The eggs are laid on the pod or in the flowers. In the case of the nature pod no hole through which the insect enters is ~~seen~~ seen; while in ~~case~~ of the immature ones, the hole is blocked up by the excreta of the ~~caterpillar~~ caterpillar migrated from pod on consuming the contents. The work of eating the bean commences from the embryo and then it proceeds to eat the cotyledons. Dried beans afford least chance to let them go on with their work; and while breaking it is noted with the ordinary ~~experiments~~ ~~experiments~~ ~~the~~ change ~~the~~ its colour from creamy to pale orange and also reduces the size of the body. Pupation is favoured. Many cases of death in this state.

Egg period .....

Larval period .....

Pupal period.... 10-15 days.

Imago period..... 2-3 days. They died apparently from want of food in the breeding cases.

Des.

Color: dark brown  
body with sharp  
pods.

Devonshire

Sept. 12, 1919.

~~Thickness~~

The borer is getting virulent and nearly all the pods will show the signs of the pest. As a moderate estimate of 55-50% of the beans will be damaged due to the pest.

Mr. Mathieu says that the damage due to the fungus and the pest amounts to full 50%. Out of the 20 pods I shelled I could get only a dozen of good uninjured ones. This will give the idea as to the virulence of the pest.

Regarding the death of the Smilacaria Macrophylla seedlings  
During the latter half of the Feb., it came to my notice that  
there were a lot of deaths in the potted seedlings of the S.M.  
The next was at once taken up to investigate the cause of the  
same.

The appearance of the seedlings was just like that of those of  
attacked by mildew those suffering from lack of water.

The examination of the roots, stem, and the leaves gave a  
clue to the solution of the investigation.

Starting with the exam. of the roots, I could not find anything  
wrong with them. There were a lot of fibrous healthy roots/  
which filled the pots. The stem was the next one for exam.  
and one could distinctly see the mischief was done to it.  
In certain places, it presented a shriveled appearance  
with a hole or two either in the centre or at the side of the  
thickened part. The lvs. except in some cases, had a hole in  
the axillary bases.

The stem was cut open and there were a lot of round-headed  
beetles which when identified were found to be Scelididae.  
( Cannot say which sp. )( Possibly Kyleborus sp. ) They had  
cut either longitudinally either through the fifth and part of  
several only/ or transversely. With the tissue could be seen  
larvae and pupae. ( without any case ) This shows that the  
beetles, once got into the plants, reproduce there. As these beetles  
are said to be ambrosia, beetles were cut to see whether they  
had done so. ( i.e. cultivated fungus ). The culture showed  
that hyphae could be seen on encrusting cut from all roundy beetles.

Insect to say which species )

Scelididae beetles are reported to bore in the dead wood, but  
rarely in the living plants. ( Befrey, Vines, 1880. See in Doyle  
( Arctic Ento. Oct.

This edition was more or less to the limit of the living plants.

The Mr. Carter was requested ~~to~~<sup>stop the</sup> sale of the plants.

The affected lot was isolated from the non-affected one. Out of 72 the 105 plants, 50 were suspected to be attacked by the beetles.

TRAPLINE. I caught my one and here the insect entered the stem but possibly by directly attacking the stem and propagating numbers. With a view to protect the stem from the ravages of the insect, it was painted with GUM in which was put some NATHALIN powder. This might prevent the entry (in the absence of any other in the world. ) Whole oil soap (tried in Ceylon.) releasing the bushes.

This (gum and Nathaline) is defective in that it effectives is washed out in the rain. Addition of resin or any other adhesive will improve this point. After examining a few days after the paint, it was found out that the paint was washed out, but in a few places cut open, I found the holes washed. (I caught w/ none of the remedies under going now are tried.

Similarly, bait, a bundle of dry sticks, was kept putting baits to attract the insect to the bundle. (This is done in Viticulture in Berbey.) I did not find any being attacked to the n.

Imm. - Larva

Pupa (without pupal case.)

soft & white.

Round headed with spines

It is a curious sight to see the pupa, moving the free part of the abdomen,

(Insect in all stages preserved in Rectified spirit.)

The seedlings (in pots.) of *Streptocarpus* *Macropyllea* are damaged by a Soiled weevil. (*Xyleborus* sp.) The larva enters through the stem, it seems to the axils of the leaves, or by boring a hole on the stem a little above the ground. Then it makes inside galleries either longitudinal or horizontal, and makes a gallery in the stem.

At first sight, it seems the plant is suffering from water but on closer examination, the true cause is noted. The larva denudes the bark rapidly for a long time. The stem at the point of the attack shrivels and either in the middle or on the side of the shrivelled spot the hole may be found.

Inside the injury inflicted by the borer is as follows. The borer eats the fibre as well as the wood which is the favourite food of the insect. It is said to cultivate a fungus on which the larvae feed. With this object, of ascertaining this fact, scirpings from the cavity were put in gelatine solution for germinating. They did well only few germinating. (Applied Entomol. Oct. 1918, 12434)

The larvae are soft white while the pupa are without pupal cases. The insect is very small, and is always found just laid deep in the burrow.

Remedy Brief. Till the material at hand. Painting the stems with gum mixed with Napthalene.

*Nature of injury.*

Imago      Pupa      Grub.



and which I observed to fall on dead and dried weed seed; but in this case the poison killing him was largely organic (i.e., of Indian hemp type,) which it feeds on dried weed, and the native *Lycorella trapezoides* (sheep louse) found in the herbage to be the first of many other living in the foliage.

Romody. Dried weeds used to attract the beetles. These consisted of dried weed - which - without any field. After a fortnight it was noted that the dried weeds were buried under the helminth chrysalis of the flea beet. but I could not find the insect. The plants used seem to have a deleterious effect on the shrub of the plant. In many cases it was observed that it was验证.

Depth of litter will be quite good for the larvae.

Sept. 5, 19.

*Hibiscus Sabdariffa* y--- How.

The flea beetle --- pink. (polymorpha).

Out of the four ~~खेतों~~ plots in wherein this plant is grown, those in the nursery are seriously attacked by the pest.

Elsewhere no insect is seen but the plants have ~~hole-holes~~ <sup>through</sup> leaves with <sup>holes</sup>.

The beetle feeds on the leaves and floral buds as well. On the latter, the point of attack is near the base of the st. bud, while in the former case the start is made from any place, either the base, or top or the middle part.

The main injury is done to the floral buds which drop in large quantity, or else do not develop.

fell like  
corners on  
the sides

Fat/7

Sesbania caterpillar.

Acherontia styx (Death's head moth).

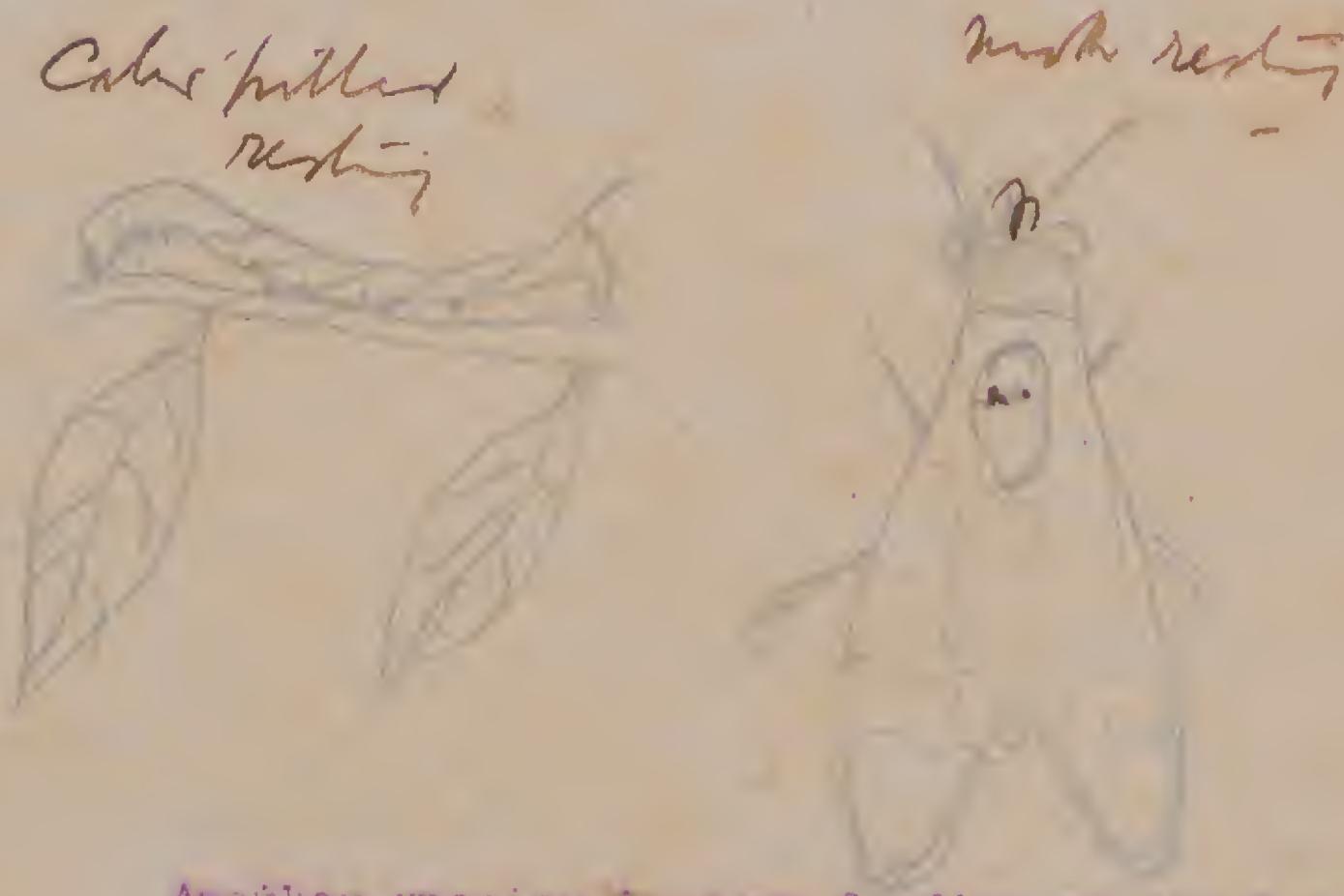
This is a pest on the plant. The caterpillar eats the leaves and sometimes the whole plant is stripped of the foliage. This feeds on the capsules.

A very large are a caterpillar, with slanting bands and a long towering horn at the end of the abdomen. In the very young larva the slanting bands are not observable.

Life history.

The moth is a dusky and beautiful to look at.

Remedy:— Picking the larvae, trapping the moths at light which is most effective.



moth resting

Another species is seen feeding on the leaves of *Phaseolus tetragonolobus*. The larva is a deep yellow with brown stripes. It was parasitized by a fly and died. The fly maggots were unknowingly thrown away.

## Sweet potato.

### Leaf roller of the crop:—

This seems to be the only pest of the crop so common in the island of Singapore and the Malaya Peninsula.

The growth is very vigorous and within a few days it produces dense vegetation of foliage. This growth is not so violent and the lush type is not so taxing because of the rapid growth of foliage.

The pest is conspicuous and the rolled in the sign of the jaws of the pest. All leaves of the plant are susceptible to the attack of the pest and there is no preference shown. It will be found on young twigs and old as well.

The caterpillar cuts the leaf after the fashion of the adult  
entirely so as to roll it, the leaf being tied up with the milky  
secretion of the insect. The caterpillar is a tiny one of pale green  
colour and quite transparent one, with two to three white transparent  
bands on the sides and the back. The mouth parts are horny and the  
insect devours the leaf ~~xxxx~~ only the palisade tissue and leaves the  
veins intact, giving the leaf appearance of the lattice. If. of  
*Ouvirandra fenestralis*, the inside being filled in with the excreta of  
the insect. It jumps on disturbance and hence care in collecting  
otherwise it is lost and again a trouble com. While breeding it is  
observed that the colour changes from that of green to orange  
and the size small. This, I think is due to the irregularity in  
feeding and heat. This is thought to ~~hasten~~ <sup>hasten</sup> the pupation period.

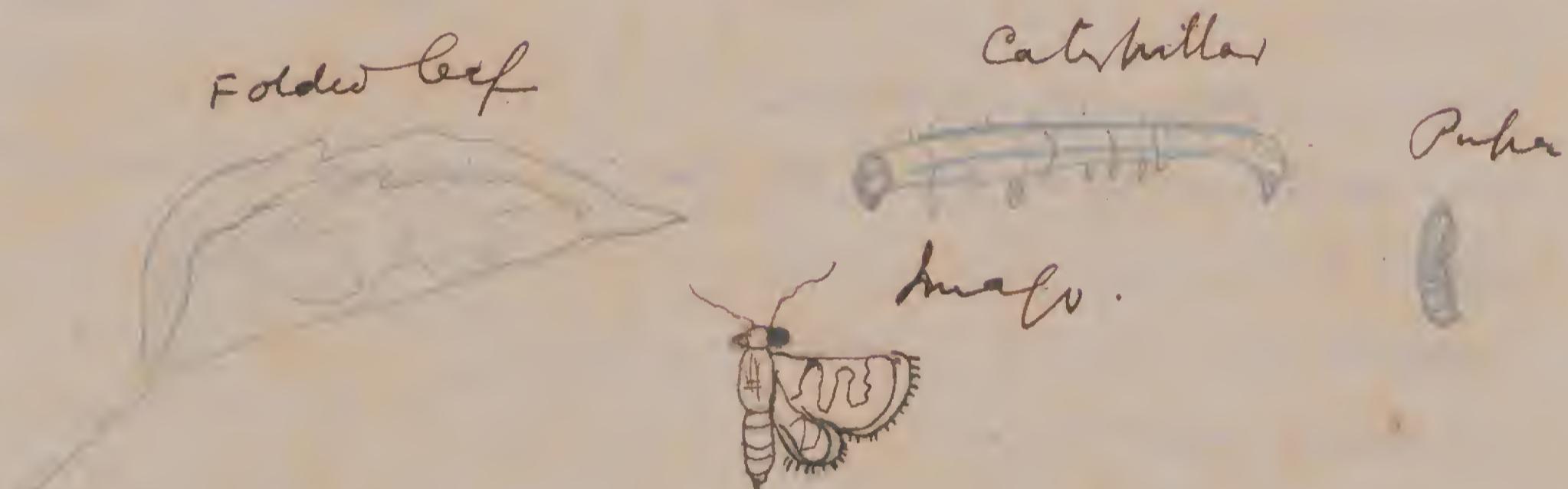
Larval period seems to cover a fortnight, collected 12 Aug. 19.  
pupal period. 26 inst. The caterpillars were small and or it may  
be taken to 3 weeks, or so.

pupal period 6-10 days. The pupal cases are of pale yellow colour. The imago is 7 cm. in length and nearly double the length in

### Sweet-potato. ( contd ).

across. The wings are characteristic of the moth. The well-set and conspicuous fringe and the wavy lines -- lines fold ~~on~~ on themselves before touching the border and doubling on themselves. The border line is also worth attention and a means to know the moth. On death, the wings either close on themselves and the own account cannot be told definitely. They wings are then held vertically. The antennae are long and flabby. The whole body is covered over with silvery scales ~~xxxx~~.

The only remedy we can effectual in this practice is to catch the beetles and kill or bury them. Spraying the trees is of no use.



### Briar leaf eating caterpillar.

Briar has a very bad pest in this caterpillar of a moth which is always act-ed on the sheets of the plant. They feed in swarms and prepare web like inhabiting place for their protection. They enclose the whole top portion and bind it with the thread, this being their ~~secretion~~ secreted. If they are thrown down they produce this thread and climb up by means of this thread.

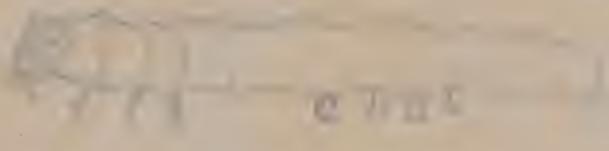
The caterpillar is blackish with interrupted whitish strips.

The life history is ~~follows~~ --- Larval period pupal period 10-15 days. Imago period. 6-8 days as observed in the cage.

The moths ~~seen~~ to be nocturnal in habit. They ~~small~~ are small in size. with dusky wings. (wings with two big black spots on the outward side of the same).

~~they~~ The caterpillars do a lot of damage, and eat the leaves and the buds. Their point of attack is easily noticed. Remedy :--- picking up the bound leaves and destroying or burying them. At night time, light trap serves best to attract the moths.

Caterpillar



Adult



Moth



Brimful fruit basket and the flower basket.

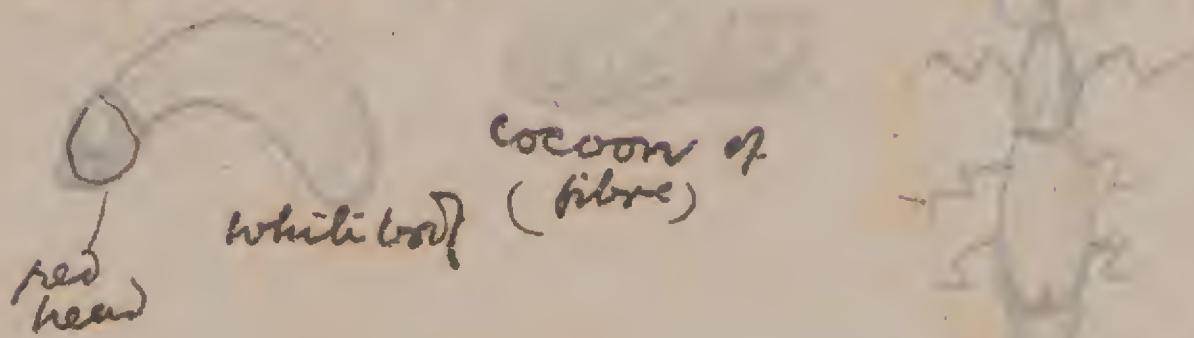
### Plantain stem borer (*Odontopera glabriocollis*)

This is the bane to the banana growing here. The grub larva feed in the stem and does a good deal of ~~of~~ damage. The outward symptom of the presence of the larva feeding is the exudation of gum through the hole. This gum is found through out the whole ~~the~~ canal of the larva. The tissues at and ~~at~~ by the side of the canal rot and give out awful smell. The larva goes up the stem feeding and pupates in the stem, in the ~~coconuts~~<sup>plantain</sup> cocoon of the ~~coconuts~~ fibre. The weevil is generally found in the stem ~~which~~. This is a shining black creature with the final joints of the abdomen visible. The weevil lives for a long time without air. Over ~~2~~ days.

Remedy:— No other remedy but uprooting the affected plants seems to be possible. The larva is seen to go even to the true stem of the banana.

Larval (legless)

Imago. weevili.



Planthopper Leaf roller. (Butterfly. *Erionota thrax*.)

Butterflies except a few are mostly harmless, the exceptions are rice, lemon, naucu, castor, the pulse butterflies and many others, are of ~~xxxxxx~~ importance, to the economic zoologist. The Banana butterfly which seems to be absent from the India, is very common not only on the banana but it is said to feed on the palms such as *livistonia* and many others, it being the common food plant.

This pest is common through the Island of Singapore, and can be held to be responsible to damage the plants to a great extent. The leaves are the object of attack which are sheaded and form and made into rollers for the protection of the caterpillar. The roll of the leaf is very strong and is passed as it were by the gumy substance of the larva. The larva is pale green copiously covered with waxy powder (white). It is 2-3 in. long when fully grown and .5 in. through. It is narrowed towards the front side and thickened towards the anal side. The mouth is a big black horny structure which helps the larva to cut the leaf very effectively and devour the same quite readily. The sight of the banana plant in characteristic to when this feeding. The rolls of the leaf hang down as if stuck to the mid rib. This may be mistaken for the injury ~~caused~~ due to the Wind. It is said that crows are very effective in picking the larva, and hence it absent from the Indian tracts. Here crows ~~canaries~~ except those introduced by the pen friend of Pahang? were reported to be preying on these, and have done a good clearing of these pest.

2. The larva makes a very close tight roll which is not accessible to a beetle or any other insect except the wasps eat the parts of the same. (roll).

Plumosa leaf roller. (contd.)

The life history is as follows:—

Eggs cream yellow are laid by the female which dies after this operation. They hatch out about 8 days, and the larva begins to roll the leaf and commence the work of eating. The larval period lasts for 15 days. It pupates in the especially made by the last molt of the larva, in the leaf roll, and emerges out after about 12-15 days.

It commences laying eggs after 4-5 days and continues till it dies. In the field it is seen hovering about the plants (banana) and resting on the under side of the leaf, where eggs are laid. The butterfly is a big one with an expanse of 2-2½ in. dusky colour with yellow stripes at the ends of the wings. The eyes are big red at the top of which can be seen the long knobbed antennae. Eggs are of the size of the mustard. The body is densely hairy.

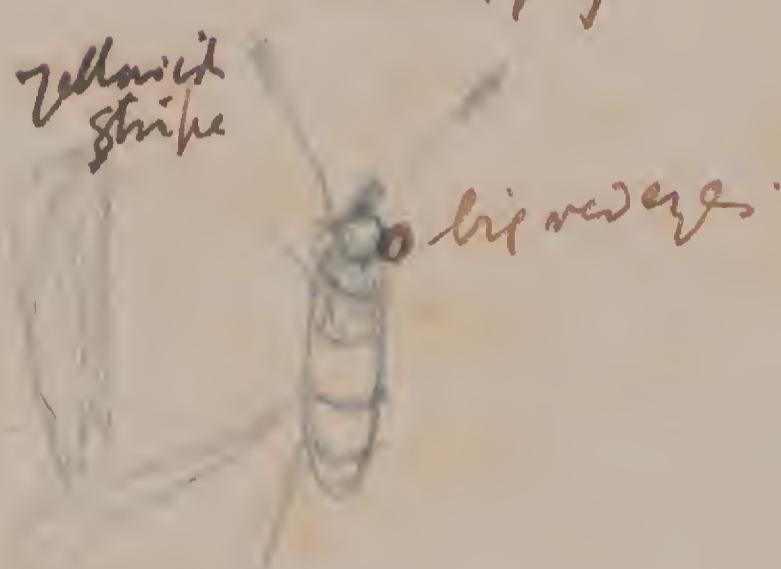
The plant suffers much owing to the laboratory being being brought down by the pest.

Remedy:— cutting the shredded leaves and keeping watch on the insects. They can be caught by nets or else wind. Crows as it is suggested above seen to have a beneficial effect on the plants.

Caterpillar



Butterfly





The time of brood seems to coincide ~~with~~ the season of growth of the plant. Still, it is observed that if the season of growth is early or late then the ~~injury~~ before the injury advances the tree puts forth its fruit. But if it is late then the caterpillar eats the whole shoot and all dry. Shoots being the parents of the fruit.

The *Mangifera Foetida* sprouts earlier and hence escapes the injury to the extent of having the chance of producing the a few fruits, the rest ~~being~~ dropping and if formed falling.

~~secondary~~  
The effect on the plant:--- ~~The~~ ~~injury~~ ~~is~~ ~~done~~ ~~to~~ ~~the~~ ~~plant~~ ~~which~~ ~~is~~ ~~done~~ ~~by~~ ~~the~~ ~~caterpillar~~  
Dormant buds on the ripe wood which are never observed to take up are seen sprouting all over the branch. 2 After the topsheet dries ~~out~~ three to four shoots come up from the base of ~~the~~ dried sheet. No opportunity ~~exists~~ for the tree to propagate its species. The tree becomes stunted and harbours many fungi and loses strength. It is observed (June last week 1919)

that *M. foetida* was again flowering at an unnatural season because of the pest and the strong reproductive force of the nature.

LIFE history (from only one caterpillar) :jjj

April 11, 19. caught,

" 15 pupa.

May 12 Image out.

~~The~~ ~~moth~~ ~~is~~ ~~10~~.~~m.~~ ~~long~~ ~~and~~ ~~1.4~~.~~m.~~ ~~across~~. ~~The~~ ~~hind~~ ~~wings~~ ~~are~~ ~~greyish~~

with blackish wavy lines across. The wings have fringes. When dead it turns the abdomen upwards.

## Citrus fruit/ tree and seedlings pests.

### Caterpillar of a butterfly (purple Donaean)

This seems to be a very bad pest of the orange and other plants when they are small. The caterpillars are cryptic in colour and feeds on the uppermost upper surface of the leaf, and is hot brownish on the midrib, having the appearance of the excreta. Pupates on the plant by hanging itself on to the stem, by a silk thong. There are two horns at which give out bad smell.

### Life history:-

The butterfly is a large sized one coloured in black w/ the yellow spots. There are two red spots on the hind wings.

Ready :--- Picking the caterpillars, which may be very expensive in a big plantation but on a small scale it is the most effective one. Spraying will be off active.

### Catching the butterflies .

( For full description . C.F. Lofroy. pp.403)

Mulvasseri and Bocconia <sup>h</sup> nevaa, pest.

A leaf roller ~~at~~ the --- a caterpillar of a moth *Sylepta derogata*, is very virulent on the leaves of these plants. From this it ~~can~~ appears that it is fond of the fibre plants, rarely or not at all its arena of activities is noted beyond these.

It is a pale green caterpillar with a dark line at the top of the abdomen. It is fond of feeding on the leaves of the said plants, rolling the leaves and fixing them by the silk. The eggs seem to have been on the lower side of the leaf and then it first cuts the epidermis and then the down or clinging on the upper side. It is soon to pupate in the leafroll but generally it does so in the soil.

The life history:— The eggs are laid on the lower side of the leaf. The larva then makes a roll and commences its work. It pupates after 7 days, either in the soil or in the leaf roll. Pupation period.

The moth a dusky straw colour with the wings striped lightly with black dots are seen on the cane edges of the pakan wings. The pupa is brown one.

Control:— Picking the leaf rolls seem to be the only feasible one. Light trapping may prove effective. In India, if necessary arsenite is sprayed.

Caterpillar

moth with pectoral wings  
wavy stripes of black  
brownish colour.

Mr. Bohmnick  
L. M. T.

Mr.  
19th Oct 1888

ADDITIONAL COPIES

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About the bark disease of tree. *Lansium Domesticum*.

Causative factor seems to me to be a fly (similar to the one already sent for identification.) Ants, secondary factor.  
observations by Prof. Baker. arborial.

The experiment and observations.

5<sup>th</sup> 4<sup>th</sup> 3<sup>rd</sup> no 5<sup>th</sup>  
Cath o o o o o o under treatment  
left base

A

Scraping the bark (as far as possible within the reach of the ladder. Removing the ants and killing by spraying with a jet of oil of the Knapback. Tree painted with soap, soft and carbolic acid. Tying coir soaked in the solution of the soap, at the base of the trunk. Treatment ~~with~~ for the 1st tree.

The second tree left untouched.

Third, fourth and fifth earthed up to block up the inlets of the antholes. (ants found out an outlet from the holes).

After 5-6 days it was observed ~~that~~ only one or two ants on the first tree. I cannot say how they got on the tree. The bark was ruptured in many places and had the flesh like that of an apple. On this ~~area~~ there pustules flies were noticed with maggots ~~and~~ buried in the same.

~~area~~

(2) On all other trees similar pustules were noticed and the flies hovering caught. (maggots and pupae also in the decaying parts) It is also noticed that ants do eat the bark. ~~but~~ This is or may be due to the scarcity of food.

The new pustules on the first tree were scraped out and in a case out of ten I ~~found~~ maggot in them. In some pustules I did not see any maggot but instead I could see a small hole

hole with a brownish spot at its base. I did not see any thing with the adequate power of my hand lens.

From the above it may be safely (as far as I have observed) be concluded that the fly is ~~the~~ at the root of the rotting of the bark.

DES.

They is Agromizidae.

Ants are arboreal. They have nests (mud, in some cases in this cases ~~dry~~ dry leaves rolled together), on the tree.

Aphides are reared. (formed <sup>in</sup> under mud nests).

{ on the 4<sup>th</sup> tree, purple aphides are found.

{ the sp. of ants rearing them is different from that rearing white.

These observations, may, if you think, worth intimating Prof. Baker, be passed on to him.

Aphids can be sent for determination (in alcohol) to

Mr. K. van der Goot

Experiment station

Salatiga, Java

Memorandum

If the flies turned out to be of the genus *Afromyzza*, it is probable that they attack the living tissues but if of the fam. *Sarcophagidae*, these may feed on the sap exuding from other parts. Monocots with feeding sap and gummy exudates are usually invaded by maggots of various flies and by larvae of *Nitidulidae* and other beetles. Back of this the original gummous may be invaded by a variety of caterpillars.

Ants are known to actively attack and destroy the juicy succulent tissues of a variety of trees. A case of considerable economic importance is that of citrus trees in Cuba being severely injured by ant attack.

It is therefore, necessary, to investigate these features, one by one and determine their relationship.



